DOCUMENT RESUME

ED 162 140 CE 018 563

| | |
|---|---|
| TITLE | Methods and Materials for Teaching Occupational Survival Skills. Problem Solving. |
| INSTITUTION | Illinois Univ., Urbana. Dept. of Vocational and Technical Education. |
| SPONS AGENCY | Illinois State Office of Education, Springfield. Div. of Adult Vocational and Technical Education. |
| PUB DATE | 78 |
| NOTE | 56p.; For related documents see CE 018 556-569 |
| AVAILABLE FROM | Curriculum Publications Clearinghouse, Western Illinois University, 76B Horrabin Hall, Macomb, Illinois 61455 (entire fourteen-unit set, $15.00) |
| EDRS PRICE | MF-$0.83 HC-$3.50 Plus Postage. |
| DESCRIPTORS | Adult Education; *Career Education; *Decision Making; *Human Relations; Information Seeking; *Job Skills; Learning Modules; *Problem Solving; Senior High Schools; Work Attitudes |

ABSTRACT

This occupational skills instructional module on problem solving is one of twelve making up a curriculum guide on the human aspects of working in organizations. The modules are designed for utilization at various educational levels ranging from high school to adult and continuing education, in either academic or vocational programs. This module is organized into nine sessions: (1) what is problem solving, (2) rating your problem-solving skills, (3) and (4) problem-solving steps, (5) solving problems in groups, (6) fact findings, (7) idea finding, (8) solution finding, and (9) evaluating the solution. Each session is arranged according to the following components: topic; objective; skills emphasized (a listing of specific skills, e.g., making independent decisions, following instructions); notes on the importance of the session topic; list of materials and equipment needed (a copy of each student worksheet, transparency and/or handout is included); activity (description of how to conduct activity); and follow-up (discussion questions or activities to assist students in summarizing or evaluating the session topic). Teacher resources including the titles, sources, and descriptions of books, articles, and audiovisual aids conclude the module. A 16-item multiple choice test for use with this module is available in document CE 018 569. CE 018 556 describes the twelve modules and their development. (JH)

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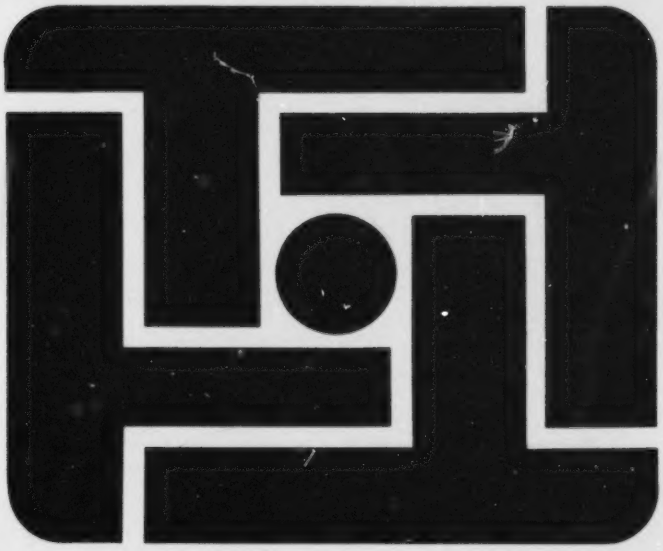
ED162140

## Methods And Materials For Teaching

# Occupational Survival Skills



# Problem Solving

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PROBLEM SOLVING

# Methods and Materials for Teaching
# Occupational Survival Skills


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1978

These curriculum materials have been developed and published under a contractual agreement between the Illinois Office of Education, Department of Adult, Vocational, and Technical Education, Research and Development, 100 North First Street, Springfield, Illinois 62777 and the Department of Vocational and Technical Education, University of Illinois at Urbana-Champaign

ACKNOWLEDGMENTS

The project staff wishes to express their gratitude to the many people who provided expertise, services, and support to the development of the curriculum modules. Special thanks is expressed to the students and teachers who provided feedback during the field testing stages of the project. This information was extremely useful in revising the modules.

Appreciation is expressed to Dr. Rupert N. Evans, Acting Chairman, Department of Vocational and Technical Education, University of Illinois, Urbana, for his encouragement, leadership, and guidance throughout the project. The project staff is also indebted to the staff of the Research and Development Section, Department of Adult, Vocational and Technical Education, Springfield, Illinois, for their support.

The research efforts of Sharon Lund O'Neil, Thomas Scanlan, Joyce Nies, and Kent Frison, conducted during the outset of the project, helped to provide the basis for the development of the curriculum modules. As contributing authors to the early versions of various modules, the project staff is grateful to Norma Turok, Glenda Huffman, Charles Jackson, and Christopher Kalangi.

For typewriting, proofreading, correcting, and reproduction of the modules throughout the project, special thanks is given to Anna McClintock, Evelyn Stewart, Ruthann Ryan, Colleen Nichols, Steve Hauersperger, Barbara Cain, and Terry McKenzie. Delmar Burgin, Betty Richards, and David Turner provided expert administrative assistance to the project.

Robert E. Nelson
Project Director

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The twelve Occupational Survival Skills Modules are not numbered. Instructors are encouraged to use Modules in any order that best fits their needs.

# Problem Solving

*"Here, make it easy on yourself."*

## Topic Outline:

Students will have an opportunity to understand the steps involved in solving problems and will apply these steps to problem situations.

## Module Objective:


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# Problem Solving: Overview

Most people solve problems every day, whether they are students, workers, or homemakers. Some problems are small and have simple solutions. Others are difficult and complicated for a number of reasons:

a) the problem itself may be unclear
b) the problem may have many possible solutions
c) the problem may not have one "perfect" solution
d) the problem's solution may cause other problems
e) the best solution to a problem may be impossible to carry out.

Because we are likely to face many different kinds of problems, we need to learn to be flexible in our thinking. For example, figuring out how to fix a car engine is different from figuring out how to get along with a grouchy co-worker. Yet, the process of solving any problem involves four basic steps:

fact finding
idea finding
solution finding
evaluating

The fact finding step involves gathering all facts and information that relate to the problem and defining the problem exactly. Surprisingly, this step is often neglected. To get the problem solving process off to a good start, the fact finding stage is a must.

The idea finding step means thinking of as many solutions as possible. During this stage we can ask others for ideas as well as thinking of them ourselves. By thinking carefully through the idea finding stage, we may be able to improve or combine ideas to come up with a better solution.

The solution finding step consists of deciding on one solution that seems to solve the problem best and putting it into action. When deciding on a solution, we have a chance to consider the advantages and disadvantages of a number of solutions before choosing one.

Evaluating the results of the solution is also a very important step in solving problems. If the solution solved the problem and did not create any new problems, the problem solving process is finished. If the solution did not

solve the problem, or if it caused new problems, we must decide if the solution should be changed in any way. If the solution did not work, the person needs to find out why:

Was the problem defined incorrectly?
Was a better idea for a solution overlooked?
Did the solution cause some unexpected or unwanted results?
Was the solution put into action incorrectly?

In other words, if the solution does not work, the problem solver must start the process over again.

Workers face several kinds of problems:

- personal problems between workers or workers and supervisors
- technical problems in doing a job in the most effective way
- policy problems with the rules and regulations of the firm
- work-home problems in fitting together life on the job with life at home.

The idea of having to face so many kinds of problems may seem discouraging. However, workers who have good problem solving skills may view problems with confidence. Developing problem solving skills requires practice. In this module the steps of problem solving are explained and activities are provided for practicing problem solving skills.

# SESSION ONE

TOPIC: What is Problem Solving?

OBJECTIVE: By working in a group problem solving situation and identifying different problem solving situations in their own lives, students will develop an understanding of the meaning of problem solving.

SURVIVAL SKILLS EMPHASIZED:

- Knowing your strengths and weaknesses
- Using initiative
- Following instructions
- Basic writing skills

IMPORTANCE: We solve problems in all aspects of our lives, in our work, in our play, and in our relationships with other people. Workers who have poor problem solving skills may actually create problems for themselves when trying to solve a problem. The activities in this session illustrate the meaning of problem solving.

MATERIALS AND EQUIPMENT:

One copy of Student Worksheet #1 - T Puzzle Solution for each group of five students
One T Puzzle cut from cardboard for each group of five students
Student Worksheet #2 - Identifying Problems and Solutions
Student Worksheet #3 - Problem Solving and Work

ACTIVITY: T Puzzle*

1. Divide the class into groups of five students. Give one student in each group Student Worksheet #1 - T Puzzle Solution. The worksheet is not to be shown to the other group members at any time during the activity.

* Adapted from Communication Games, Karen Kruper, The Free Press, New York. 1973. Reprinted by special permission.

2. Give each of the remaining group members one puzzle piece. Each group should have all four pieces needed to complete one puzzle.

3. Explain that each group must complete the puzzle as quickly as possible, observing the following rules:

   - The person who has the solution may not show it to the other group members.
   - The person who has the solution may not touch any of the puzzle pieces.

4. Allow about 10 minutes for groups to solve their puzzles.

FOLLOW-UP:

1. Explain that the activity students have just completed involved problem solving. Use the following questions to lead into a discussion of the meaning of problem solving.

   - How did your group solve the problem?
   - What other methods could your group have used?
   - Did your group have difficulty solving the puzzle?
   - Did your group use methods different from the methods of the other groups?

2. Ask students to name different types of problems.

   - Math problems
   - Personal problems
   - Family problems
   - School problems
   - Environmental problems
   - Unemployment problems
   - Financial problems
   - Health problems

3. Suggest that problems have one thing in common--a situation exists in which a person is not certain of what to do. Problem solving, therefore, is the process of deciding what to do about a situation.

   - Problems may be small, and they may be solved quickly. For example, when playing a game of checkers, deciding on each move is a small problem.
   - Problems may be large and take years to solve. For example, the problem of pollution cannot be solved quickly without creating serious transportation, economic, and other problems.

4. Ask students to name kinds of problems they might have to solve in a work situation.

   - Personal problems--getting along with others
   - Technical problems--figuring out how to do a job
   - Work-home problems--fitting together the two parts of your life, at home and on the job.

ACTIVITY: Identifying Problems and Solutions

1. Distribute Student Worksheet #2 - Identifying Problems and Solutions. Read through the instructions given on the worksheet with the students. Allow students about 10 minutes to write their responses.

2. After students have ranked their solutions, ask them to share their best and poorest solutions with the class.

   - Why do you believe the solutions you ranked 5 was the poorest?
   - Why do you believe the solution you ranked 1 was the best?

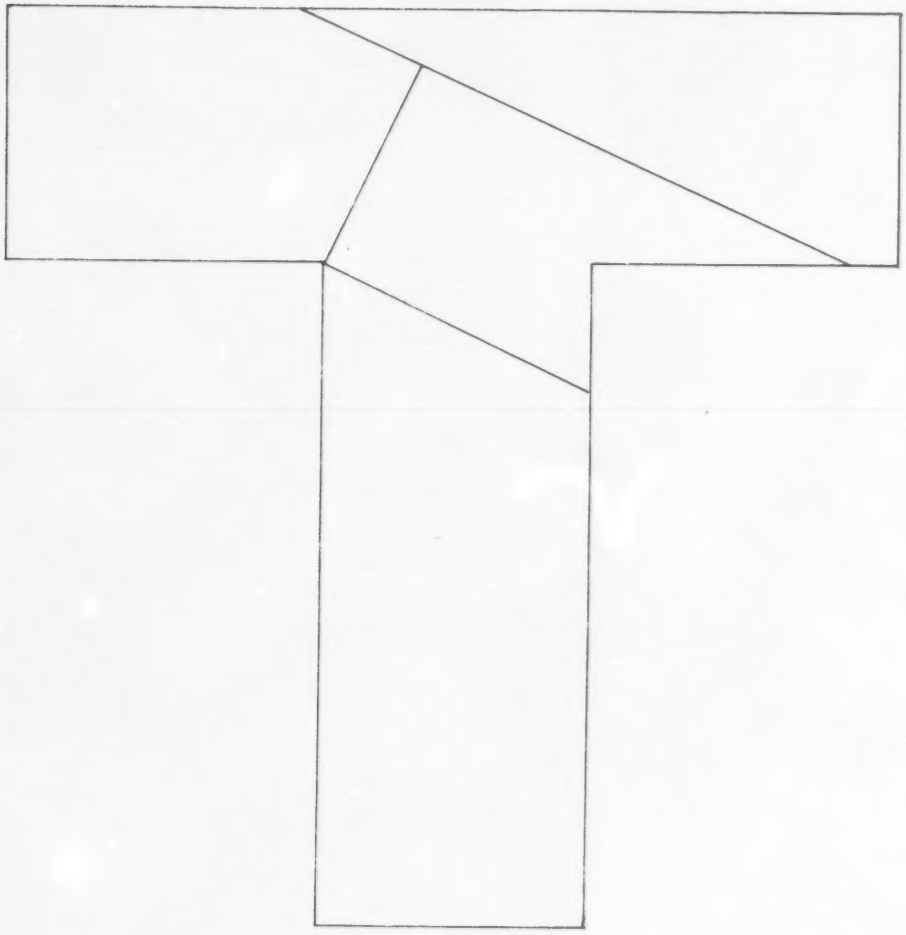
FOLLOW-UP:

1. Ask students to read one of their problems to the class and have other students suggest solutions. Compare these suggested solutions with the solution actually used.

2. As an out of class assignment, have students take Student Worksheet #3 - Problem Solving and Work home. Have them ask their parents or other working adults for their definitions of problem solving and how they apply these definitions in their work.

# Student Worksheet #1 T Puzzle Solution

It is your task to give instructions to the other members of your group for assembling the T Puzzle which appears below. Your group has all of the pieces to the T Puzzle. The pieces to the T Puzzle are in shapes that correspond to the lines on the T Puzzle below. The other members of your group may not look at this sheet. You may not touch any of the puzzle pieces.



# Student Worksheet #2
## Identifying Problems and Solutions

You solve problems every day of your life even though you are not always aware that you are solving problems. Think back over the past week and list five problems you have faced and the solution you reached.

| PROBLEM | SOLUTION | RANKING OF SOLUTIONS |
|---|---|---|
| 1. | 1. | |
| 2. | 2. | |
| 3. | 3. | |
| 4. | 4. | |
| 5. | 5. | |

After listing your problems and solutions, go back and rank your solutions from 1 to 5, with 1 being the best solution and 5 being the poorest one.

What else could have helped you find a better solution?

# Student Worksheet #3 Problem Solving and Work

Ask one working adult to define problem solving, and to explain how problem solving is used in work situations. Use the following questions as a guide. Write the responses in the space provided.

1. What is your definition of problem solving?

2. How do you apply your definition of problem solving in your work?

3. What kinds of problems are most common in your work?

4. What methods do you use to solve problems at work?

# SESSION TWO

TOPIC: Rating Your Problem Solving Skills

OBJECTIVE: Students will evaluate their problem solving skills.

SURVIVAL SKILLS EMPHASIZED:

- Understanding written information
- Knowing your strengths and weaknesses
- Basic reading skills
- Locating information
- Making independent decisions

IMPORTANCE: Problem solving is an organized, step-by-step process. Yet, many people try to solve their problems by trial and error. The first step in learning how to solve problems is to discover which skills need improving. This session is designed to help students get a realistic picture of their own problem solving skills, so they can improve the areas in which they are weak.

MATERIALS AND EQUIPMENT: Student Worksheet #4 - Rating Your Problem Solving Skills

ACTIVITY:

1. Ask students to share the information they have collected on Student Worksheet #3. Have them compare the definitions of problem solving.

   - Do you think the person you asked has a good definition of problem solving? Why or why not?
   - What can you learn from this definition?
   - How did the person apply problem solving to a work situation?
   - What are some common problems in work situations?

2. Pass out Student Worksheet #4 - Rating Your Problem Solving Skills. Go over the instructions with students and allow them about 5 - 10 minutes to complete the worksheet.

FOLLOW-UP: Go over the correct answers with students, one at a time, discussing why the answer is true or false. On the answers which are FALSE, ask students to change the statement to make it a true statement. Answers and explanations are below:

(1) FALSE. People can develop their ability to solve problems by learning and practice. Think of problem solving as being like a muscle. The more you use it, the stronger it becomes.

(2) FALSE. Some problems have many good solutions. Some problems have no good solutions. Unfortunately, sometimes we have to choose between several "bad" solutions.

(3) FALSE. When solving a problem, the best approach is to think of as many solutions as possible before choosing one. The more ideas you think of, the more likely you will be to think of a good one.

(4) TRUE. By putting a problem in the form of a question, you clarify exactly what the problem is and give yourself a springboard for thinking of solutions.

(5) TRUE. In fact, not understanding the real problem is often the biggest block to figuring out a solution. For example, suppose you have a bad cough. Your real problem may be that you have pneumonia. On a job, suppose your supervisor is constantly criticizing you. Perhaps the real problem is that you do not follow instructions. Ask students to think of other examples where the problem may be hidden or unclear.

(6) FALSE. Whenever you can, take time to think about a problem. You might just make more problems for yourself by rushing into a solution before thinking through the problem carefully.

(7) FALSE. The method of solving problems we will be learning is meant to help you avoid errors whenever possible. By considering many possible solutions and figuring out the likely results of your solutions, you can prevent many errors.

(8) TRUE. By thinking of many solutions, you may be able to combine and improve them, so you can think of the best solution possible.

(9) FALSE. After thinking of a solution, you must 1) put it into action and 2) evaluate the results. A solution doesn't do any good if you keep it in your head and don't use it! But even this is not the last step. You must evaluate to discover if your solution worked. If your solution did not work, you need to find out why and try again.

(10) TRUE. Remember that other people may have had experiences that can help you solve your problem. Of course, you must make your own decision, but by asking others, you can make a more intelligent decision.

(11) TRUE. Getting the facts is one of the first steps in solving a problem. Sometimes we think we know more about a problem than we actually know. That is, we assume things. If we are wrong in what we assume, we may decide on a poor solution.

(12) TRUE. Have you ever heard the expression "Sleep on it"? Even while you are doing something else or when you are sleeping, your mind keeps working on the problem. Also, getting away from a problem for a while helps you come back to it with fresh ideas.

(13) FALSE. One of the steps in problem solving is to try to figure out the results of your solutions. You may be surprised once in a while, but a good problem solver figures out all possible results of a solution ahead of time.

(14) FALSE. If you try to think of only practical ideas, you may stop the flow of ideas before it gets started. Also, some of your "impractical" ideas can be changed to become your best solutions.

(15) TRUE. An important way of avoiding mistakes is thinking. "If I do this, then . . . ." Think of a game of checkers or chess. Each move in the game is a small exercise in problem solving. When deciding on a move, you have to consider what move the other person will make as a result of yours. When solving a problem on the job, you may need to consider what effect your solution will have on your chances of getting a raise in pay or a promotion or what effect the solution will have on your co-workers.

# Student Worksheet #4
## Rating Your Problem Solving Skill

This is a quiz to help you rate your problem solving skills. You will not be graded. Circle either T (true) or F (false) for each of the following statements.

T F 1. The ability to solve problems is something you are born with - you either have it or you don't.

T F 2. Every problem has one good solution.

T F 3. When solving a problem, I usually try my first idea.

T F 4. The best approach to a problem is to put it in the form of a question.

T F 5. One thing that can make a problem more difficult to solve is not understanding the problem.

T F 6. It is usually a good idea to try to solve a problem as quickly as possible.

T F 7. Solving problems mostly involves trial and error.

T F 8. When solving a problem, I usually try to think of all the ideas I can before choosing one.

T F 9. Once you figure out a solution to a problem, you are finished solving your problem.

T F 10. When I have a difficult problem to solve, I like to get other peoples ideas before making a decision.

T F 11. When I have a problem, I try to find out as much as I can about the problem before trying to solve it.

T F 12. If a person stops thinking about a problem for awhile, the mind keeps on working on the problem.

T F 13. When I try to solve a problem, I am often surprised at the results of the solution I chose.

T F 14. When trying to solve a problem, I try to make all my ideas as practical as possible.

T F 15. When solving a problem, I usually try to figure out what the results of my solution will be.

# SESSION THREE

TOPIC: Problem Solving Steps

OBJECTIVE: Students will become acquainted with the four steps in the problem solving process and will apply the fact finding step to a work situation.

SURVIVAL SKILLS EMPHASIZED:

- Getting along with others
- Knowing your strengths and weaknesses
- Knowing what is expected
- Knowing how to use job equipment
- Locating information
- Knowledge of operating procedures
- Following instructions
- Working without close supervision

IMPORTANCE: Problem solving is a step-by-step process. Leaving out a step can actually create problems. The first step involves figuring out exactly what the problem is and getting all the important facts. Although this may seem like an unnecessary step, it is important because it is the basis for the rest of the process. This session demonstrates the importance of the fact finding step and gives students an opportunity to practice this step of problem solving.

MATERIALS AND EQUIPMENT:
Transparency #1 - Problem Solving Steps
Student Worksheet #5 - Rhonda's Problem
Student Worksheet #6 - Fact Finding
Overhead projector

ACTIVITY: Problem Solving Steps

1. Project Transparency #1 - Problem Solving Steps. Explain each step shown on the transparency.

   - The FACT FINDING step has two important parts: (1) Stating the problem and (2) Getting the related facts. This step is often left out, making the problem even more difficult.

- The IDEA FINDING step consists of thinking of all possible ideas for solving the problem. Sometimes asking for ideas from others who are more experienced is helpful.

- The SOLUTION FINDING step has two parts: (1) deciding on a solution and (2) acting on the solution. Deciding on a solution involves thinking of all possible results of your solution. Acting on your solution means figuring out exactly how you are going to carry out your solution.

- EVALUATING means asking yourself "Did my solution work?" If it didn't work, the process starts over again.

2. Distribute Student Worksheet #5 - Rhonda's Problem. Have students answer the questions. Use the questions on the worksheet to lead a discussion:

   - Rhonda seems to think the problem is that she has been accused of stealing and that she could lose her job.

   - Students are likely to see that Rhonda is probably not being too realistic. The problem may be that Rhonda is simply not using the cash register correctly. The point is that Rhonda has not defined the problem correctly.

   - Some possible questions are:

     How can Rhonda keep her job?
     How can Rhonda get her boss to see her side of the story?
     How can Rhonda learn to do her job correctly?

   - Emphasize the point that putting the problem in question form can help give a clearer idea of how to solve it.

3. Distribute Student Worksheet #6 - Fact Finding, and have students list all facts from the problem. Some of the facts relating to this problem include the following:

   - Job during Christmas holidays

   - Rhonda is a high school senior

- Job involves pricing stock and helping to display and sell merchandise
- Maria Lopez was to orient Rhonda to the job
- Orientation was to involve location of merchandise, how to price it, and how to operate the cash register
- Maria Lopez gave few instructions
- Rhonda overheard salesperson talking to her boss
- Salesperson said "register has not balanced out since Rhonda started to work here." (Cash register may be over and not just short.)
- Rhonda believes she is being accused of stealing

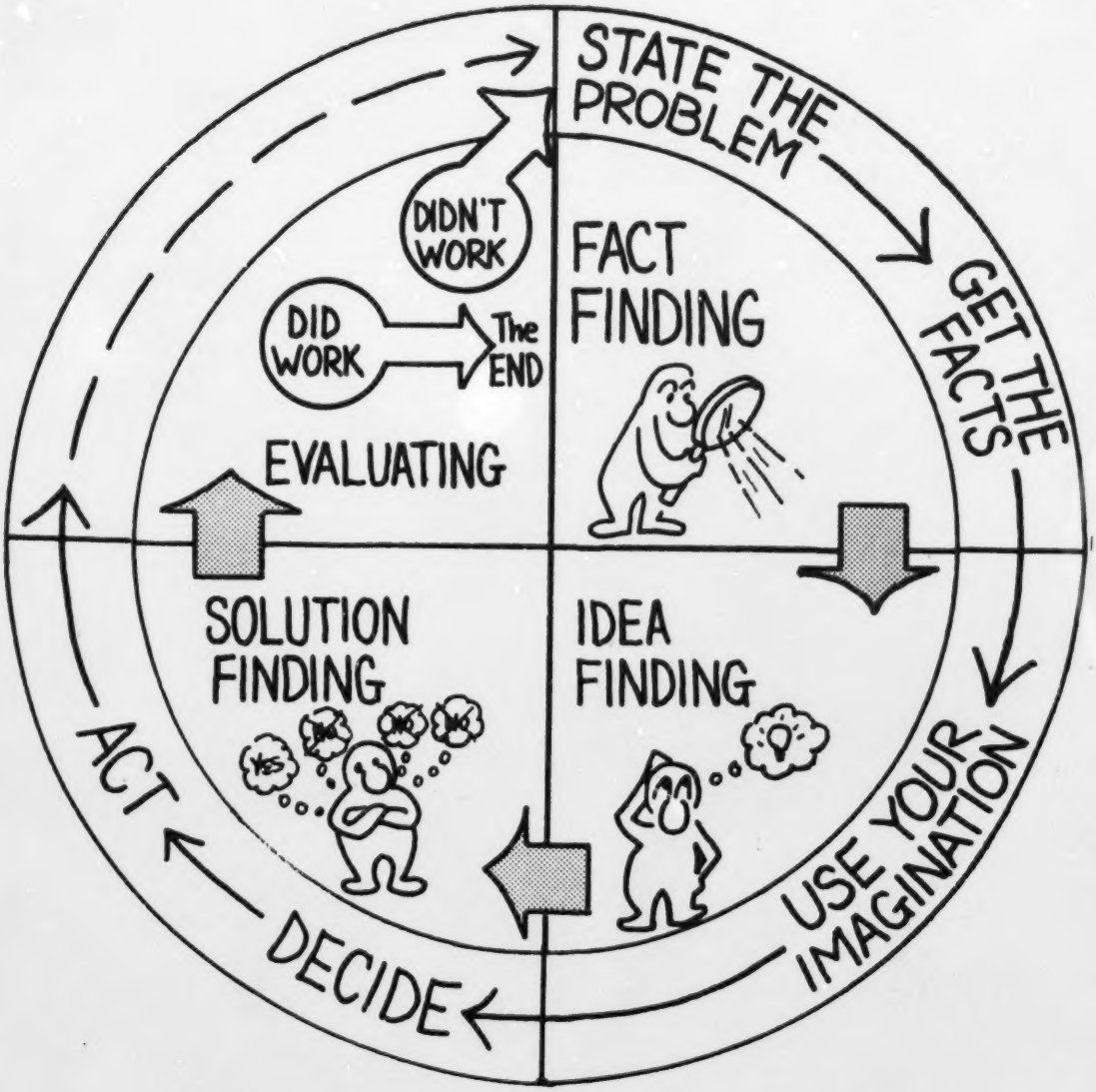
4. Have students decide whether each fact is important or unimportant to solving the problem, and have them check (✔) the proper column for each item.

FOLLOW-UP:

1. After completing Student Worksheet #6, have students discuss their responses. Some discussion questions might be:
   - Does everyone agree to the ratings? Why? Why not?
   - Now that you have listed all information about the problem, do you have any new thoughts relating to the problem?
   - What facts is Rhonda ignoring?
   - How can the fact finding step help workers avoid mistakes in solving problems?

   NOTE: Student Worksheet #5 will be needed for Session Four.

## Transparency #1 Problem Solving Steps



# Student Worksheet #5 Rhonda's Problem

List all facts relating to the problem situation.

| Fact | Important | Not Important |
|---|---|---|
| 1. | | |
| 2. | | |
| 3. | | |
| 4. | | |
| 5. | | |
| 6. | | |
| 7. | | |
| 8. | | |
| 9. | | |
| 10. | | |
| 11. | | |
| 12. | | |

Now go back and circle the numbers of the three most important facts and the three least important facts.

What you believe to be the three most important facts may differ from what others may think.

What facts is Rhonda ignoring?

# Student Worksheet #6 Fact Finding

Rhonda, a high school senior, found a job during the Christmas holidays in a variety store. Her job was to price stock and help display and sell merchandise. Rhonda's boss asked one of the more experienced salespeople, Maria Lopez, to show Rhonda the location of merchandise, how to price it, and how to operate the cash register. Because business was especially heavy, Maria had very little time to spend teaching Rhonda the procedures. Rhonda managed to figure out most things by herself or by asking her co-workers. Rhonda is enjoying her job, although she sometimes gets frustrated when she doesn't know how to do a task she is given. She is also having a hard time getting to know her co-workers because the store is so busy.

On her sixth day at work Rhonda overheard one of the other salespeople telling her boss that "ever since that girl started to work the money in the cash register does not balance with the cash register tape." Rhonda was shocked. She felt she had been accused of stealing. Rhonda considers herself an honest person and a good worker, especially since she has had to figure so many things out for herself on this job. Now she is afraid she will be fired for stealing when she knows she is innocent.

1. What does Rhonda seem to think is the problem?

2. What do you think is the problem?

3. Write the problem in the form of a question. (Hint: begin the question by saying "How can Rhonda. . . .?")

# SESSION FOUR

TOPIC: Problem Solving Steps (Continued)
Idea Finding, Solution Finding, and Evaluating

OBJECTIVE: Students will understand the last three steps in the problem solving process by applying them to a work situation.

SURVIVAL SKILLS EMPHASIZED:

- Working as a team member
- Basic writing skills
- Use of job equipment
- Knowledge of operating procedures
- Following instructions
- Working under pressure

IMPORTANCE: When people try to solve problems, they often reverse the idea finding and the solution finding steps. That is, they decide on a solution, and if it doesn't work, they return to the idea finding step. After the fact finding step, ideas should be collected and examined. The more ideas that are collected, the higher the chances are for discovering a good solution. The solution finding step involves deciding on one solution and putting it into action. The last part of this step is especially important. A solution may fail if it is not put into action thoughtfully and carefully. The evaluation tells the problem solver whether the chosen solution worked. If the solution did not work, the problem solver must figure out why, and start all over.

MATERIALS AND EQUIPMENT:
Transparency #1 - Problem Solving Steps
Student Worksheet #7 - Idea Finding
Student Worksheet #5 - Rhonda's Problem from SESSION THREE
Overhead projector

ACTIVITY: Problem Solving Steps

1. Review the problem solving steps briefly, using Transparency #1 - Problem Solving Steps.

2. Hand out Student Worksheet #7 - Idea Finding. Have students imagine that Rhonda has come to them with her problem. What ideas might they give her for solving her problem? Have students write their responses in the first column of the worksheet. Tell students to think of as many different ideas as possible. Students can be assigned to work individually, in pairs, or in small groups on this. Some ideas might be:

   - Rhonda could ask her Supervisor for a more thorough orientation to her job requirements.
   - Rhonda could request more instructions for the correct use of the cash register.
   - Rhonda could quit her job.
   - Rhonda could tell the boss she didn't steal money from the register.
   - Rhonda could ask her Supervisor questions concerning the operation of the cash register.

3. Have students share their ideas with the entire class. Have the class think of good points and bad points for each idea and have students write them in the space provided.

4. Ask the class to decide on one solution, by discussing the good points and bad points of each one. The instructor may wish to write the ideas on the chalkboard.

   - Why is this the best solution?
   - What could happen if this idea were used?
   - What effect might the solution have on Rhonda?
   - What effect might the solution have on the problem?
   - What effect might the solution have on Rhonda's boss? On her Supervisor?

5. Explain that the class has now finished with the idea finding step and has begun the solution finding step. Project Transparency #1 and point out that students have just decided and are ready for the action part of solution finding.

6. Explain that the action part of the solution finding step means deciding exactly how to put the solution into action. Things to consider when planning action are:

- Will Rhonda need to make an appointment to talk with her boss or Supervisor?

- Exactly what will Rhonda say?

- What attitude should Rhonda show toward her Supervisor or boss?

7. Ask for several volunteers to demonstrate good and bad ways that Rhonda could act on the solution. One good way might be to approach the person calmly, beginning "I have a problem I need to discuss with you." A bad way might be to approach the person angrily.

8. Have students vote on whether each solution demonstrated actually solved the problem. Explain that this is the EVALUATION step. Evaluating includes asking:

   - Did my chosen solution work?
   - Did my solution cause any problems I now need to solve?
   - What can I learn from the problem and the way I decided to solve it?

FOLLOW-UP: Review the problem solving steps, referring to Transparency #1. Ask students to name exactly what the class did in each step while working on Rhonda's problem.

# Student Worksheet #7 Idea Finding

| Ideas | Good Points of the Idea | Bad Points of the Idea |
|---|---|---|
| 1. | | |
| 2. | | |
| 3. | | |
| 4. | | |

# SESSION FIVE

TOPIC: Solving Problems in Groups

OBJECTIVE: By solving the Jeps and Lings problem in a group setting, students will become aware of the advantages and disadvantages of solving problems in a group.

SURVIVAL SKILLS EMPHASIZED:

- Getting along with others
- Working as a team member
- Making independent decisions
- Basic arithmetic skills
- Managing time efficiently
- Knowing what is expected

IMPORTANCE: Many problems on the job involve groups of people, who must all cooperate to solve the problem. If each group member participates in all the problem solving steps, the group can work on the problem efficiently. Any member who does not participate interferes with the group, making it difficult or impossible to solve the problem. This session is designed to demonstrate the importance of every member in a group contributing to the problem solving process.

MATERIALS AND EQUIPMENT:
Student Worksheet #8 - Jeps and Lings Instruction Sheet
One set of the Jeps and Lings Information Slips for each group of six students, cut along the dotted lines
Transparency #1 - Problem Solving Steps
Overhead projector

ACTIVITY:

1. Explain to the students that they are going to participate in an experiment in group problem solving. Divide the class into groups of six students. (Extra students can be assigned to be observers. Have them identify the problem solving steps as they occur in the groups.)

2. Distribute Student Worksheet #8 - Jeps and Lings Instruction Sheet, and go over the instructions with students. Project Transparency #1, so students may refer to it.

3. Give each of the six students in each of the groups one of the Information Slips.

4. Give students about 10-15 minutes to work on the problem. If a group gives you an incorrect answer, tell the group to start over on the problem. (Answer: 4 pums)

FOLLOW-UP:

1. Have students identify exactly what they did during each step in the problem solving process:

   - Fact finding

     (1) The problem was defined on the worksheet
     (2) All group members could share the information on their slips with the group

   - Idea finding - exactly how did the group go about solving the problem?

   - Solution finding

     (1) Which idea did group members decide to use to approach the problem?
     (2) How was the solution put into action?

   - Evaluating - The solution was checked with the teacher. What happened if the solution was incorrect?

2. Use the following questions to discuss the group problem solving activity:

   - Did you like working in the group? Why or why not?

   - Do you think you could have solved the problem more easily working by yourself if you had all the information?

   - Did all group members contribute to solving the problem?

   - What would have happened if one person had refused to share information with the group?

   - Did your group have any difficulty working together to solve the problem?

- Which problem solving step seemed the most difficult for your group? Why was this step difficult?

- Why is it important for workers to cooperate and help each other when solving problems?

# Student Worksheet #8
## Jeps and Lings Instruction Sheet

Pretend that your group is using a new money system. Instead of using dollars and cents, the new system uses jeps, lings, and pums.

You will each be given a slip that has information that will help your group to solve the problem. You may tell the other group members the information on your slip. But you may not show your slip to anybody.

The task of your group is to figure out how many pums the group has left. Remember to follow the problem solving steps on the overhead projector.

When you believe your group has the correct answer, check it with your teacher.

# Jeps and Lings Information Slips

| | |
|---|---|
| We received three Jeps | We spent 20 lings |
| A jep is 8 lings | A ling is 5 pums |
| We found 4 pums | We lost 4 lings |

# SESSION SIX

TOPIC: Fact Finding

OBJECTIVE: By analyzing a work situation, students will understand the importance of stating the problem and getting all the important facts.

SURVIVAL SKILLS EMPHASIZED:

- Making independent decisions
- Knowing what is expected
- Basic writing skills
- Working under pressure
- Following instructions

IMPORTANCE: Workers can be more effective when trying to solve problems by first learning as much as they can about their problems. Although this may seem like an extra or unnecessary step, workers can actually save time and energy by becoming familiar with a problem before trying to solve it. The fact finding step can lead to ideas for solving a problem. This session gives students an opportunity to practice the fact finding step of problem solving.

MATERIALS AND EQUIPMENT:
Transparency #2 - Hints for Fact Finding
Student Worksheet #9 - The Tardy Employee
Student Worksheet #10 - Hints for Fact Finding
Overhead projector

ACTIVITY:

1. Project Transparency #2 - Hints for Fact Finding, and review the fact finding step with students.

2. Distribute Student Worksheet #9 - The Tardy Employee. Have students underline all the important facts that relate to the problem in this case. Then ask them to state their responses aloud, telling how each fact is important in solving the problem.

   - Jane scored very well on the placement tests given her. (She seems to have the makings of a good employee.)

- One of her strongest points was her ability to deal with difficult customers. (This is a big asset in her job.)

- Paul saw her as tactful and courteous and felt these were important characteristics for the person who filled the job. (Jane seems to be the right person for the job.)

- Jane is a fast learner. (She has many assets--it would be a shame to lose her.)

- After a month, Paul checked timesheets and found she had a tardiness problem. (Paul has just recently become aware of the problem.)

- Paul did not confront her on two previous instances when he saw her walk in late. (Paul had hoped the problem would take care of itself.)

- In her first month at work, she was tardy five times. (The tardiness is not just a one-time occurrence.)

- The following week paul called Jane into his office. (Paul tried to deal with the problem.)

- He told her the tardiness was unacceptable. (Jane knows where he stands on tardiness.)

- She replied that her husband had to be to work by 8 and she had to drop the baby off at the day care center. (Jane has what she considers an acceptable excuse.)

- Jane doesn't think it should matter that she is late as long as she does her job. (Jane's opinion disagrees with Paul's.)

- Paul feels tardiness affects the efficiency and morale of the entire department. (Paul sees the problem as involving the whole department, not just one employee.)

3. Distribute Student Worksheet #10 - Hints for Fact Finding, and have the students complete it.

FOLLOW-UP: 1. Ask students to share the problems they have written in the form of questions. You may wish to write these on a blank transparency. Some possible questions might be:

- How can Paul Richards be fair to all employees when dealing with tardiness problems?
- How can Jane improve her punctuality?
- How can Paul convince Jane that being on time to work is important?
- How can Jane and Paul agree on a way of dealing with her tardiness?

2. Have students choose the question that best sums up the problem. Write the question on Transparency #2.

3. Have students share their response to the fact finding questions, WHO, WHAT, WHERE, WHEN, and HOW:

   - WHO - Jane, Paul, and the 29 department employees
   - WHAT - Jane has developed a pattern of tardiness
   - WHERE - In the department where Jane works
   - WHEN - Several mornings last month
   - WHY - Jane has not responded to Paul's efforts to solve the problem.

   NOTE: The instructor may wish to distribute Student Worksheet #11 - The Customer Service Desk at the end of this session. Students may be assigned to complete the worksheet before coming to class. This will give students an opportunity to review and practice the fact finding step and prepare them for idea finding.

# Student Worksheet #10
# Transparency #2 Hints for Fact Finding

1. Put the problem in the form of a QUESTION:

   How can. . .

2. Examine all the facts that might be related to the problem:

   WHO is involved

   WHAT is happening

   WHERE is the problem

   WHEN does the problem occur

   WHY has it become a problem

3. After examining the facts, you may see the problem differently. Go back and see if your QUESTION really "zeroes in" on the real problem. If not, change it.

# Student Worksheet #9 The Tardy Employee

Case Study: The Tardy Employee

Paul Richards is in charge of 30 service representatives for Northwestern Telephone Company. Four weeks ago he hired Jane Nelson to replace an employee who had retired. Jane is 24 years old and scored well on the placement tests. Although she hadn't worked since the birth of her child, her references from the job she held from the time she graduated from high school until that time were excellent. She had worked in the credit office of a local department store. One of the strong points her former supervisor had identified was Jane's ability in dealing with difficult customers. This was one of the reasons Paul had decided to hire her. He believed that tact and courtesy are important characteristics for service representatives who often had to deal with complaints from dissatisfied and sometimes angry customers.

Jane had learned department procedures much faster than most new employees. In fact, Paul made a point of telling her how well he thought she was doing after only one week. She just seemed to have a natural ability for calming even the most irate customer. However, at the end of the month when he checked the timesheets, Paul realized Jane seemed to be developing a serious tardiness pattern. He had noticed her coming in late twice but hadn't said anything. Generally, with new employees, walking in late in front of 29 people who are busy at their desks was embarrassing enough to keep it from happening again. With Jane it hadn't worked. In her first month she had been tardy 5 times.

The following Monday Paul called Jane into his office. He explained that, although her work was excellent, her tardiness was becoming serious and would have to stop. She replied that her husband had to be at work by 8 and she had to drop their son at the day care center. Sometimes she just couldn't help being a few minutes late. As long as she did her job well and completed her work, she didn't see why just a few minutes really made much difference. Paul tried to explain that he expected everyone to be on time, in spite of difficult personal situations. Paul believes that tardiness affects the morale and efficiency of the entire department. He also feels that overlooking one employee's tardiness is unfair to the rest of the employees.

# SESSION SEVEN

TOPIC: Idea Finding

OBJECTIVE: After applying the idea finding step to a case situation, students will understand the importance of generating and considering as many ideas as possible when solving a problem.

SURVIVAL SKILLS EMPHASIZED:

- Getting along with others
- Working under pressure
- Managing time efficiently
- Using imagination
- Knowing what is expected
- Knowledge of operating procedures
- Working without close supervision
- Adjusting to work situations

IMPORTANCE: When trying to solve a problem we may limit our ideas by judging them too quickly. Sometimes our most "far out" ideas can prove to be the most useful. Idea finding also means combining and improving ideas. The more ideas we explore, the more likely we are to come up with a good one. In this session students will practice the idea finding process and review the fact finding step of problem solving.

MATERIALS AND EQUIPMENT:
Student Worksheet #11 - The Customer Service Desk
Student Worksheet #12 - Examining Ideas
Transparency #3 - Examining Ideas
Overhead Projector

ACTIVITY:

1. Briefly review students' responses on Student Worksheet #11 - The Customer Service Desk and choose one question that best summarizes the problem in the case study:

   - A possible question is: "How can service to customers be improved during the late afternoon hours at the customer service desk?"

- WHO is involved? Mike, Mrs. Johnson, the fifth-floor manager, and customers.
- WHAT is happening? Customers have to wait in line for service.
- WHERE - On the fifth floor, at the customer service desk.
- WHEN does the problem occur? During late afternoon hours, and just after closing time.
- WHY has it become a problem? The inconvenience is causing customers and employees to complain.

2. Conduct a brainstorming session either with the entire class, or in smaller groups of four or five students each. Remind students to express all their ideas for solving the problem, even the amusing or "far out" ones.

3. After brainstorming, ask students if they can combine or improve any of their ideas. Then have students choose three ideas to examine further.

4. Distribute Student Worksheet #12 - Examining Ideas. Have students think of at least one good point and one bad point for each idea. A sample worksheet is provided for the instructor.

FOLLOW-UP:

1. Using Transparency #3 - Examining Ideas, write down all the good and bad points students thought of for each idea examined.
   - Did other students think of good and bad points you didn't?
   - Did the ideas seem better or worse after you examined them?
   - How can examining your ideas help you come to a better solution?

NOTE: The instructor may wish to distribute Student Worksheet #13 - Agnes and Betsy at the end of this session. Students may be assigned to complete the worksheet before coming to class. This will give students an opportunity to review the fact finding and idea finding steps of problem solving.

# Student Worksheet # 11
## The Customer Service Desk

Case Study: The Customer Service Desk

Mike works at the customer service desk on the fifth floor of a large department store. His job includes four main responsibilities:

1) answering customer's questions
2) giving directions for finding departments on all five floors of the store
3) checking packages for customers
4) selling tickets to entertainment events in the city.

Mike works with Mrs. Johnson, who is responsible for the customer service and mail order departments. Because she is busy answering the telephone and carrying out her other duties, Mrs. Johnson is seldom near the customer service desk. Since the late afternoon is a very busy time for Mike, customers must stand in line to buy tickets and pick up their packages.

Today Mrs. Hall, a long-time customer of the store, complained to Mrs. Johnson that she missed her ride home because she had to wait in line so long to pick up a package. Mrs. Hall also complained that Mike was short-tempered and discourteous to her. The fifth-floor manager is complaining because customers are kept waiting as long as 20 minutes after the store closes and he is getting tired of routing the late shoppers through the store to the exit and opening and locking the door several times each evening.

1. Underline all the important facts.

2. What is the problem here?

3. Examine the facts:

   WHO is involved?

   WHAT is happening?

   WHERE is the problem?

   WHEN does the problem occur?

   WHY has the situation become a problem?

4. Now that you have looked at the facts, can you state the problem better? (In the form of a question.)

# Student Worksheet #12 Expaining Ideas

Write down the three ideas chosen by the class for solving the Customer Service Desk problem. Then think of at least one good point and one bad point for each idea. Write the good and bad points below each idea.

Idea:

| Good Points of Idea | Bad Points of Idea |
|---|---|
| | |

Idea:

| Good Points of Idea | Bad Points of Idea |
|---|---|
| | |

Idea:

| Good Points of Idea | Bad Points of Idea |
|---|---|
| | |

# Transparency #3 Explaining Ideas

Idea: Close Customer Service desk ½ hour earlier

| Good Points of Idea | Bad Points of Idea |
|---|---|
| 1. Customers out of store by closing time | 1. Inconvenience to customers |
| 2. No hassle for fifth floor manager | 2. Does not solve the problem of customers waiting in line |

Idea: Hire a person to help Mike in the afternoons

| | |
|---|---|
| 1. Better service to customers | 1. Costs money to pay another person |
| 2. Decrease in Mike's work load | |
| 3. Speeds up service to customers | |

Idea: Mrs. Johnson could help Mike during busy hours

| | |
|---|---|
| 1. Better service to customers | 1. Mrs. Johnson would be taken away from other duties |
| 2. Mrs. Johnson could supervise Mike during this time | |
| 3. Speedier service to customers | |

# SESSION EIGHT

TOPIC: Solution Finding

OBJECTIVE: By applying the solution finding step to a work situation, students will understand the advantages of choosing a solution from several alternatives and the importance of planning action when implementing a solution.

SURVIVAL SKILLS EMPHASIZED:

- Having specialized training
- Working as a team member
- Knowing what is expected
- Working without close supervision
- Managing time efficiently
- Getting along with others

IMPORTANCE: The solution finding step involves deciding on a solution and putting the solution into action. The solution finding step requires careful thought and action. Paying special attention to planning the action can help assure the problem solver that the solution will be successful. Even a good solution can fail if it is put into action carelessly.

MATERIALS AND EQUIPMENT:

Student Worksheet #13 - Agnes and Betsy
Student Worksheet #12 - Examining Ideas (from SESSION SEVEN)
Overhead projector
Blank Transparency

ACTIVITY:

1. Briefly go over students' responses to Student Worksheet #13 - Agnes and Betsy. (The question that best sums up the problem is (a), because it includes both Agnes and Betsy as parts of the problem.) Ask students to share their ideas for solving the problem and to share the good points and bad points about each idea. Have students decide on one idea. They may wish to combine two or more ideas.

2. Ask students to suggest exactly how they could put the idea into action. Use a blank transparency to record their suggestions. That is, what steps should the office

manager take to put the solution into action? For instance, suppose the solution was for the office manager to talk to Agnes about her behavior. When should the office manager do this? Exactly what would the office manager say? What cautions should the office manager observe? What might go wrong, and how can it be avoided?

FOLLOW-UP:

1. Have volunteers role play a "wrong" way to put the chosen solution into action.

   - Why is it important to plan the action you will take?

   - How can workers avoid creating problems by planning their action on the solution carefully?

2. Have volunteers role play a "right" way of putting the chosen solution into action.

# Student Worksheet #13 Agnes and Betsy

Case Study: Agnes and Betsy

You are the office manager at Idex Corporations. One of your main duties is to supervise the office workers. Your biggest problem right now is with Agnes, who has worked for Idex for twelve years. She was hired by the man who is now the Vice President of Idex, and they are good friends.

You recently hired Betsy, who is an excellent executive secretary. Betsy has already started having trouble with Agnes. You are not surprised about this, because the last three persons who were hired to fill Betsy's position eventually resigned because of Agnes. Agnes is extremely nosy and tries to boss everyone, including Betsy. Agnes tells Betsy how to do every little detail, letting her own work get behind. Agnes used to be responsible for supervising the office staff when the company was smaller, but she no longer has this responsibility. She answers the telephone and listens to the conversations of the other employees.

You have discussed firing her with the Vice President, but since she is a good friend of the V.P. and he originally hired her, he is not willing to allow her to be fired. She is a widow and must support her two children, so she needs the work.

Agnes receives a much higher salary than Betsy but does much less work. Betsy is more qualified than Agnes and has a much larger work load. Agnes also has keys to all the offices, and you caught her in your desk one day when you returned to the office unexpectedly. Agnes does, however, have excellent typing skills and is pleasant and friendly to the public.

Betsy is threatening to leave if this situation is not corrected. Since she is such an excellent worker and you have already lost three employees, you want to keep her if at all possible.

1. Circle the question you think sums up the problem best:

   (a) How can the office manager help Agnes and Betsy get along with each other?

   (b) How can the office manager get rid of Agnes?

   (c) How can the office manager keep Betsy from quitting?

2. The related facts:

   WHO is involved?

   WHAT is happening?

WHERE is the problem?

WHEN does the problem occur?

WHY has it become a problem?

3. Ideas for solving the problem:

# SESSION NINE

TOPIC: Evaluating the Solution

OBJECTIVE: After applying the evaluating step to a problem situation, students will understand the importance of evaluating the results of a solution when solving a problem.

SURVIVAL SKILLS EMPHASIZED:

- Getting along with others
- Working as a team member
- Knowing your strengths and weaknesses
- Knowing what is expected
- Managing time efficiently
- Working under pressure

IMPORTANCE: Problem solving is not complete until the results of the solution are evaluated. Evaluation is important because it gives us information about how well a solution worked. It also tells us whether we need to take further action. When one solution does not work we may need to go back to the fact finding step to discover whether we have overlooked an important fact or defined the problem incorrectly. We may discover that our solutions caused problems we did not expect. Evaluation helps us learn from our mistakes and failures as well as from our successes.

MATERIALS AND EQUIPMENT:
Student Worksheet #14 - A Problem Between Friends
Transparency #4 - Evaluating a Solution
Overhead projector

ACTIVITY:

1. Hand out Student Worksheet #14 - A Problem Between Friends, and have students read the case. Point out that in this situation Jan has tried to solve the problem. At first she thought her solution worked, but later she found that it hadn't.

2. Briefly review the related facts:

   - Jan and Tim are best friends and have known each other since kindergarten.

- As Jan took an order, she saw Tim take the tip from the table next to hers and put it in his pocket.
- The policy was for all waiters and waitresses to collect their own tips and turn them into the office.
- The tips were recorded, deductions made, and the employees each received a share as part of their weekly paychecks.
- Gloria told Jan that three groups did not leave her any tip.
- Jan knew what was happening and confronted Tim.
- He finally admitted that he had been taking tips.
- He thanked Jan for not telling Mr. Alberts and promised not to do it again.
- Jan agreed to forget the incident.
- A week later, several waiters and waitresses were complaining about being short on tips.

3. Explain that sometimes even good solutions of problems do not work. That is why evaluation is an important step in solving a problem.

4. Project Transparency #4 - Evaluating a Solution. Ask students to answer the question aloud.

FOLLOW-UP:

1. Explain that now Jan starts the problem solving process over again. This time she has one new fact: Tim did not keep his promise to stop taking the tips.

2. Ask students for ideas for solving the new problem. Three possible solutions are:

   - Talk to Tim alone
   - Talk to Tim and Mr. Alberts together
   - Have a meeting with Tim, Mr. Alberts, and the other employees

3. Have students decide on a plan of action, outlining exactly what Jan might do and say. A possible plan of action for the first solution:

   - Tell Tim how disappointed you are that he didn't stick to his promise.

- Tell him you do not want to lose him as a friend, but that he is hurting you and the other employees by decreasing the amount of money you are earning. Point out that he is also affecting his own future.

- Tell him you feel you will be forced to talk to Mr. Alberts and tell him what is happening if things continue as they are.

4. Have volunteers role play the new solution and have the class evaluate the results, using the guidelines on Transparency #4.

# Student Worksheet #14 A Problem Between Friends

Case Study: A Problem Between Friends

Jan Gray and Tim Moore have been friends since they were in kindergarten when the Grays became the Moores' next door neighbors. Both Jan and Tim will be attending Gilford College in the fall so their friendship is likely to continue. It was also Tim who introduced Jan to her steady boyfirend, Tim's best friend, Mike Alexander.

During the spring, Tim started working as a busperson at one of the nicest restaurants in town. He mentioned a number of times what a nice place it was to work and how much he was able to save for college because of the excellent tips. Tim knew that Jan wanted a job for the summer, so when he heard that Mr. Alberts, the manager, was accepting applications for summer help, he suggested that Jan apply as soon as possible. Because she applied early, Jan was hired and started working part-time and weekends as a waitress even before graduation.

Besides being able to save some money, Jan really enjoyed her job. The job was very different from anything else she had ever done. She enjoyed constantly meeting new people and the challenge of providing the best service she could. Mr. Alberts stressed the importance of teamwork and how each employee affected everyone else. Jan could clearly see what he meant. She was impressed by how cooperative and helpful everyone was. Being new, she especially appreciated the other employees' helpful suggestions and the way they occasionally gave her extra help if she was having problems organizing things.

About a month after Jan started, both she and Tim were scheduled to work the Saturday evening shift. In fact, hers was one of the stations Tim was assigned to bus. As she was taking an order, she noticed that as Tim was clearing the table next to her, he picked up the tip and stuffed it into his pocket. The policy was for waiters and waitresses to collect their own tips and turn them into the office. The tips were recorded, deductions were made, and then each person received a share as part of the weekly paycheck. At first Jan thought Tim must just be trying to clear the table as quickly as possible because it was so busy and that he planned to give the money to Gloria when he was finished. It was awfully busy so she didn't have time to give it much further thought--at least not until much later that evening when she and Gloria were figuring their tickets and tips.

"Boy," sighed Gloria, "some people really have nerve! I had three groups who didn't leave me one red cent! It wouldn't make me mad if I hadn't given them good service, but I did."

"That's a rotten thing to have happen. I really am sorry."

"You ought to be, it affects all of us."

"It does, I hadn't thought about it that way."

It didn't take long to figure that Tim must be pocketing tips on a regular basis. Because they were such good friends, she felt she had to ask him about it. At first he didn't say anything, but finally he admitted that was exactly what he had been doing.

"Listen, Jan, I appreciate your concern that I'll get myself into big trouble. I'm glad you talked to me first and didn't go to Mr. Alberts. It won't happen again. I won't put you on the spot again. Let's just forget about it. OK?"

That was fine with Jan, and she did just that. Then, about a week later they were scheduled to work together again. Though Ja didn't notice anything unusual, at closing several of the waiters and waitresses complained about being short on tips. They weren't just complaining about customers, they were beginning to suspect that "someone" was taking their hard-earned money.

# Transparency #4 Evaluating a Solution

1. Did the solution solve the problem? If not, why not?

2. Did the solution create any new problems? If so, what are they?

3. What steps need to be taken now to solve the new problem?

# Resources for Teachers

## BOOKS, ARTICLES, AND ACTIVITIES

Gibb, C. Glenadine, *Creative Problem Solving, Preliminary Edition*, Texas University Research and Development Center for Teacher Education, Austin, Texas, 1970.

Contains three modules designed to teach creative problem solving. The modules are entitled (1) application of deferred judgment, (2) recognizing the real problem, and (3) developing the solution. Instructor's guides for all modules are included with the student workbook for the third module. For each module goals are stated, operational objectives are defined, and teaching procedures are outlined in terms of desired learning outcomes, instructor behavior, and student behavior. Students are given practice in problem redefinition, brainstorming, generating and evaluating solutions, and overcoming mental sets.

*How to Use Your Imagination--The ABC's of Creative Problem Solving*, a scriptographic booklet, Channing L. Bete Co., Inc., Greenfield, Mass., 1977.

One of a series of six illustrated booklets for use in values education. Emphasizes the need for imagination when solving problems, and outlines the step-by-step process of problem solving.

Koberg, Don, and Bagnall, Jim, *The Universal Traveler--Soft-Systems Guide to: Creativity, Problem Solving and the Process of Design*, William Kaufmann, Inc., Los Altos, California, 1974.

An imaginatively written and illustrated book which looks upon problem solving as a journey. The authors believe that all problems can benefit from the same logical and orderly process. They translate the language of cybernetics into a conversational approach to creativity, problem solving and design.

Maynard, Fredrlle, "Solve Your Problem the Expert's Way," *Reader's Digest*, July 1976, pp. 96-99.

Describes and illustrates six problem-solving strategies, including (1) reversal, (2) redefinition, (3) planning for results, (4) breaking routines, (5) brainstorming, and (6) making a minus a plus.

## AUDIO VISUAL RESOURCES

*Basic Job Skills: Handling Daily Problems*, available from the Audio Visual Service, University of Illinois, Urbana, IL 61801. Request film number 04402. (11 minutes)

Three experienced workers, an x-ray technician, a restaurant manager, and an equipment supervisor for a construction company, illustrate how most

job problems can be solved logically, through communication and compromise. They offer practical suggestions to co-workers, who discover an effective way to resolve conflicts--identify the problem, think about it, and talk about it. A 1976 production.

*The World of Work*, - On the Job, Educational Resources Division, Educational Design Inc.

Consists of 14 lesson tapes and 6 discussion tapes. The course presents problems encountered by employees during their first few weeks on a new job. Also includes student record booklets. Situations are presented in an informal, conversational manner through narration and dialogue. Each lesson tape includes lesson questions and review questions to which the student must respond by writing in an answer booklet. Tapes may be studied individually or in a group and taken in any order. Topics covered include New on the Job, Dealing With Supervisor, The Rules of the Game, Moving Up or Out--specific situations cite needling and new man on the job, how to handle a talkative co-worker, getting help and information, etc.